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Geography and Navigation Compleated;

BEING A

New Theory and Method

WHEREBY THE

True LONGITUDE

Of any Place in the WORLD

May be FOUND:

Whether Differing in *Longitude* only, or both in *Longitude* and *Latitude*, from any Other Place in the Habitable World.

By *GEORGE KEITH*, M. A.
Rector of *Edburton* in *Sussex.*

Most Humbly Proposed to the Consideration of the *First Present Parliament* of *GREAT BRITAIN* after the Happy UNION.

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THE PREFACE TO THE Impartial Readers.

THere are no Judicious and Skilful Persons in Geography and Navigation, who will find fault with the Title of this Small Treatise, if once they be satisfied, that the Discovery I here present to their View, is true. For that a True Discovery of the Longitude, would compleat both Geography and Navigation, is so far from being any Hyperbole in Speech, that it is confessed by all Learned Men in those Sciences, that a True Discovery of the Longitude would compleat them.

If any skilful in Mathematical Learning have any thing to offer against this New Theory and Method I have set forth to Publick View, how to find the Longitude, I shall take it kindly, if they please to write to me their Objections, they paying the Postage of the Letters they send to me, directing them to Mr. Brab. Aylmer *at the* Three Pigeons *in* Cornhill. *But I pray them not to trouble themselves nor me with unlearned Objections, that have no seeming Weight of Reason in them; that any ordinary Schoolboy or Novice, who has but begun in the Study of those Sciences, would not be at the Pains nor spend Time to reply unto. But I withal desire them to put their Names to what they write to me, (otherwise I am not like to take any notice of them;) that I may not be troubled with Heaps of Letters that signify nothing to the Purpose. The only thing that they should*

object, is, what they think is not Mathematical, or what is not built on Fundamental Principles of Geometry and Aſtronomy: And let them not bring ſuch Objections againſt this Diſcovery, that is of Equal Argument againſt the finding the Latitude, as the Longitude. Alſo I deſire them to take notice, that tho' theſe Twelve Principles ſet down by me in the firſt Four or Five Pages of my Book, are ſufficiently clear unto me; and I doubt not but they will be to many, as well as unto me; yet I have not built my Theory upon them all, but only ſome of them; divers of them being only for Illuſtration, and not for Argumentation; ſo as that if any of them might ſeem doubtful to ſome Readers, that will be no ſufficient Reaſon to overthrow my Theory. And let them not ſay the Thing is not demonſtrated, or they are not ſatisfied with my Proofs, and yet give no Reaſon for their ſo ſaying; but they ought to ſhew wherein the Defect lies, and by Mathematical Evidence to convince me that any of my Grounds and Fundamental Reaſons are falſe. Neither let them take occaſion againſt me for ſome Circumſtantial Matters, if poſſibly there may be any that hurt not the Foundation. Nor for Faults of the Preſs; one of which I find in the beginning of Page 3, *which correct thus:* The Declination of the Fixed Stars (as about ſome Seconds *per Ann.*) is no more an Argument againſt finding the Longitude, than finding the Latitude.

And if any that ſhall happen to read this little Treatiſe, who are both Learned and Impartial; as I doubt not but it will find many ſuch both at Home and Abroad; when they have duly examin'd it, and that in due Time all the Learned World will be ſatisfied with it, and the Demonſtration that I bring for it, is approved by them; if they pleaſe to ſignify ſo much to me, they will not only do an Act of Juſtice towards me, but to Mankind in general.

GEORGE KEITH.

Geography and Navigation Compleated.

BEING

A New Theory and Method

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True LONGITUDE

Of any Place in the World, may be Found.

SOME Indubitable Principles in Geometry and Aſtronomy preſuppoſed, for the better Underſtanding the Demonſtration of this New Method of Finding the Longitude of Places, from any Firſt Meridian, and the Difference of Longitude between any Two Places.

I. Any Two Triangles having Two Sides correſponding and equal to each other, and the Angle either Equal or Common; where theſe Two Sides meet, the other Two Angles reſpectively are

Equal, and the Baſis is Equal to the Baſis. *Elem. Euclid, Lib.* 1. *Prop.* 4.

II. All the Fixed Stars keep the ſame Diſtance one from another, whereever they are, and whatſoever *Azimuth* they appear on; the Diſtance of any Two Fixed Stars is always the ſame, on all *Azimuths* and Meridians.

III. The Caſe is the ſame with reſpect to the Longitude, whether we follow the Hypotheſis of *Ptolomy* or *Copernicus*: But if the Starry Firmament be ſuppoſed to move, the Earth muſt be ſuppoſed to reſt; or if the Earth be ſuppoſed to move, the Starry Firmament muſt be ſuppoſed to reſt.

IV. The Arch *AB* of the Greater Circle repreſenting a Circle in the Heavens, is equal to the Arch *AB* in the Leſſer Circle, in any *Azimuth* and in any Meridian Circle; whether there be Two Stars, the One at *A* and the other at *B*, or One Star only, and the other a Fixed Invisible Point. (*Vide Scheme.*)

V. The Points *A* and *B* in the Leſſer Circle of the Earth being ſuppoſed to be Immoveable, have Immoveable Zeniths.

VI. The Declination of the Stars (as about 50 Seconds *per Ann.*) is no more an Argument againſt finding

finding the Latitude, than finding the Longitude.

VII. Seeing in this New Method of Finding the Longitude, the Operation is only by the Fixed Stars, and neither by the Sun nor by any other of the Planets, no regard is to be had precisely to the Diversity of Time, when a Star comes to your Meridian; as if the Knowledge of the precise Time of the Night were necessary: For all such Diversity of Time, why a Star comes not every Night to your Meridian at the same Time, proceeds from the Sun's continual Declination, and his going from the Stars, and not the going of the Stars from him.

VIII. The Longitude of Places, and Diversity of Time, are different Things, and not the same: For the Longitude of Places are Real Things that actually exist together, and are Permanent Things; whereas Time is not such, but is in a Continual Flux. Yet the Longitude first being found, gives the Difference of Time.

IX. All Arches of Circles, Great or Small, drawn from one Center, so that they are Concentrick and Intercepted by the same *Radii*, are equal in Degrees and Minutes; as in the Scheme, Where the Arch *AB* in the Celestial Orb is equal to the like Arch in the Lesser, that represents the Terrestrial Orb. The

which

which Principle is the Foundation of the *Quadrant*, *Croſs-Staff*, and *Aſtrolabe*, and other Mathematical Inſtruments for meaſuring Arches and Angles.

X. And ſeeing this Manner of Operation has no regard to any preciſe Time of Day or Night, it is prepoſterous to preſuppoſe the Knowledge of the Exact Time when any Star is either in the Zenith or on the Meridian of your Place: And any ſuch Objection that argueth for the Knowledge of the preciſe and exact Time when you are to Obſerve your Star, is to overthrow all finding the Latitude by common Practice of Seamen, who are never curious to know the preciſe and exact Time when they ſhould Obſerve the Sun or a Star's coming to the Meridian, but they begin their Obſervation of the Sun's ſtill Riſing higher and higher, until he Riſe to the Higheſt for that Time; and generally they begin early to make their Obſervations, as commonly about Eleven or a little after; and they wait to ſee how the Star ariſeth by their Inſtrument, until he come to his Greateſt Height; and thence they conclude he is come to his Meridian for that Day.

XI. An Error of a few Minutes, in finding the Longitude, is no other or greater Error, than what is frequently and unavoidably committed by all Seamen, in finding their Latitude: And Seamen would think themſelves well helped

helped at Sea, if any ſhould Teach them to find their Longitude within Nine or Ten Minutes, or more.

XII. The Praxis or Operation I undertake to Perform at preſent, is, To Find the True Longitude of any Place in the World, whether at Sea or Land, where you are, or whither you happen to come; and not where you are not, and whither you are never to come; even as you can only find the Latitude of the Place where you are, and not where you are not, and whither you are never to come. But by Seamens obſerving the like Method as I ſhall uſe in this, who may happen to be in thoſe Remote Places, I will ſhow them by their keeping a Correſpondence by Letters betwixt themſelves and others in Remote Places, who may be taught to find their Longitude in thoſe Remote Places where they are; and conſequently, by the Rules here given, the True Longitude of all Places in the World where Navigation is uſed, may be found by Aſtronomical Obſervations, and Trigonometrical Calculations. And thus Tables of Longitude may be compoſed for the General Benefit of Seamen to all Navigable Places, and of all Places paſſable by Land, where they have never been, and whither they are never to come.

The Explication of the SCHEME.

THE greatest Circle, *A B C G H D*, represents sometimes the Equator, and other times some other great Circle in the Starry Firmament, according to the several Cases to be resolved, about the Longitude and Latitude of Places.

The Lesser Circle represents the Concentrick Circle on the Globe of the Earth.

P represents the *North* Pole.

A G represents the Equinoctial Colure, where I chuse to begin the First Meridian; it being allowed by all skill'd in Astronomy, that it is left to Mens Choice where to begin it; seeing it is easy by Addition or Substraction, as the Case requires, to reduce the vulgar first Meridian, which is Ten Degrees *East* from the Equinoctial Colure; and *e contra*, the first Meridian at the Equinoctial Colure to the vulgar Meridian; differing only Ten Degrees the one from the other: Withal minding, that what is call'd in the Starry Firmament the Right Ascension of the Stars from *Aries*, the Point of Intersection of the Equator and Ecliptick, on the Equinoctial Colure upon the Earth, may be called Longitude of Places; beginning at *Aries* upon Earth, on the Parallel Equinoctial Colure, at the like Intersection of the Equator and Ecliptick upon Earth. For that there are such Parallel

rallel Circles and Lines on Earth, artificially described by Artists in Astronomy and Geography, as the Equator, the Ecliptick, the Equinoctial and Solstitial Colures, and Ecliptick, and Points of Intersection of *Aries* and *Libra*, is evident from those Circles and Lines usually described in Globes and Maps visible to our sight, corresponding to these in Heaven, Parallel and Concentrick unto them.

C D represents the Solstitial Colure.

The Arch *A B*, marked with Two Stars, under the Two Letters *A* and *B*, represents the Distance on the Arch of a Great Circle in the Starry Firmament, betwixt the Star *A* and the Star *B*; and if there be no visible Star at *B*, but only at *A*, as oft happens, there is a Point at *B* in the Starry Firmament, that keeps the same Distance always from *A*, as if there were a visible Star at *B*.

A in the Greater Circle, and *B* in the same Greater Circle, represent Two *Zenith* Points or Stars, to *A* and *B* on the lesser Circle of the Globe of the Earth: And though they be but once, in the Revolution of 360 Degrees in the *Zeniths* of *A* and *B* in the lesser Circle, yet they are still at the same Distance, and may well be called *Zenith*-Points or Stars over *A* and *B* in the lesser Circle. But to take an Observation with your *Astrolabe* at Sea, and with your *Quadrant* at Land, you must have always one Star (as at *A*) to look unto, and make your Observation by the same.

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The Arch *E F* represents the Diſtance in the Arch of a great Circle on the Globe of the Earth, of Two Places differing more or leſs in Latitude, but having the ſame Longitude; to which is to be conceived (though not deſcribed in the Scheme) a Parallel Arch in the Starry Firmament, having two Stars, or one Star and a Point; but ſuch a Parallel is not *B A* in the greater Circle; and though not viſibly deſcribed to the Eye, yet is eaſily conceived by the Mind.

As the Declination of any Star is equal to the Latitude of the Place over which it is Vertical, once in the Revolution of 360 Degrees, which I call a Common *Zenith* Star or Point, which all Stars of the ſame Declination have in common together: So where a Star is to be found, or a Point, in the Firmament, that has both the ſame Declination and Right Aſcenſion from the Equinoctial Colure that the Place over which it is at ſome time Vertical, hath the ſame Latitude and Longitude; that Star or Point I call a Proper *Zenith*; for ſuch a Property belongs to no other Star in the whole Firmament. For as no one Place in Earth has the ſame Latitude and Longitude with any other Place on Earth; ſo no Star or Point in Heaven has the ſame Declination and Right Aſcenſion. And one only Star there is, or Point in Heaven, that has its Declination equal to the Latitude of the Place over which it is a Proper *Zenith*; and alſo its Right Aſcenſion equal to the Longitude of that particular Place, reckoning its Longitude from

the

the Equinoctial Colure: The which is eaſy to be found, both on Globes and Planiſpheres, if they were made in a true Conformity, the Heavenly Globes and Maps to the Heavens and Starry Firmament, and to a true Conformity to the Places on Earth, ſo as to be ſet down in their true and proper Situation; But no ſuch Terreſtrial Globes or Maps have yet ever been extant, but abound with great and foul Errors, eſpecially with reſpect to their Longitudes. But by this New Theory and Method, New Terreſtrial Globes in proceſs of Time may be made, to anſwer ſo exactly to the Heavenly, as the Impreſſion of the Seal or Stamp anſwers to the Seal it ſelf, on Paper or Wax: And if there were ſuch Globes ſo juſtly made, the Declinations and Right Aſcenſion of every Star in Heaven would exactly correſpond in equality to the Latitude and Longitude of the Place over which that Star or Point is a Proper *Zenith* or Point: And two Planiſpheres, the one Celeſtial, and the other Terreſtrial, ſo rectified by this New Theory and Method of finding True Longitudes to all Places on Earth, being ſo adjuſted, that the Equinoctial Colure in the Heavenly Planiſphere be ſet upon the Equinoctial Colure in the Terreſtrial Planiſphere; and the Solſtitial Colure in the Heavenly Planiſphere to the Solſtitial Colure in the Terreſtrial, and both ſet upon one Center; the finding only the Latitude of your Place at Sea, by Obſervation of your proper *Zenith* Star in Heaven, and ſetting it under the pro-

per *Zenith* Star or Point in Heaven, would ſo exactly anſwer the one to the other, that your Latitude would ſtill give your Longitude in all Places, where you are, at Sea or Land: And a ſmall Prick with the Point of a ſmall Needle, through your proper *Zenith* Star or Point in the Celeſtial Planiſphere, would make a particular Impreſſion or Mark upon the Place or City in the Terreſtrial Planiſphere, as Ocular Inſpection would demonſtrate: But as yet no ſuch Planiſpheres have been extant: However, ſuch as they are, with all their Errors, may be of ſome Service, by the *juxta* Poſition of the one upon the other, ſo far as to detect the Error, and find out the Truth, by making New Obſervations.

But it is a great Miſtake, if any think that this would be a *Petitio Principii*, or running round in a Circle: For to run round in that called a vicious Circle, nothing is really and truly effected; but here there is: For you would have this as a neceſſary *Queſitum* to be found, *viz.* every Day that the Sky is clear, to find your true Latitude; and then you would have Three Sides of a Spherical Triangle; *viz.* the Complement of the Latitude of the Place whence you came, for one Side, and the Complement of the Latitude of the Place where you now are, for the other Side, and the Diſtance ſailed, on the Arch of a great Circle for the Third Side; and by a Canon in the Spherical Oblique Triangles, the Three Angles can be found; and the Angle at the Pole is the Lon-

gitude

gitude between the Two Places; which if there were True and Juſt Terreſtrial Planiſpheres, only by means of finding your Latitude, without any Trigonometrical Calculation, by Ocular Inſpection, you might find your Longitude, or Difference of Longitude. But becauſe no ſuch Planiſpheres are yet made; the Ship-Maſter who would learn this New Method muſt be well taught both to project the Triangle, and alſo to find the Angle at the Pole, which is the Longitude of the Place, betwixt where you now are, and the Place from whence you came, both at your firſt ſetting out, and of your Advance and Progreſs every Day by the differing Latitude that you come into from Day to Day, until you are come to run out the whole Difference of your Latitude from the beginning of your Voyage; and then you are at the Place whither you were bound: For by running out your Latitude upon the Arch of a great Circle, where you began, you do likewiſe run out your Longitude, and are at your Port you deſigned for. And if you be driven out of the Arch of your Circle by Currents or Storms, it is but to begin a New Arch, which is as good as the former which you were driven from.

Some POSTULATA, *in Order to Landmens Finding the Longitude of the Place on the Earth, where they are; and Seamens Finding the Longitude of the Place where they are at Sea; taking their Observation of ſome known Star,* East *or* West *from the Equinoctial Colure; if there be none upon it, anſwering to the Latitude of the Place where they are.*

I. *Poſtulatum.* TO be furniſhed with a good Quadrant of Two or Three Foot *Radius* or more, if it can be conveniently had, for Landmen to find their Longitude at Land; and large and good *Aſtrolabes* and Croſs-Staffs for Seamen to find their Longitude at Sea, whereever they are.

II. That the Perſons who would learn this Practice be ſo far skilled in the common Principles of Aſtronomy and Navigation, as many Ship-Maſters are; and alſo to have ſome Knowledge in Arithmetick and Geometry.

III. That they be taught by ſome Mathematick-Maſters alſo the Names and Situations of ſome few Stars, with their Declinations and Right Aſcenſions, as correctly given by Learned Authors. And ſuch as are more learned, ought not to rely altogether upon any Tables of Declination and Right Aſcenſion, but rather

rather find them out by Art; of which, for ſo few as are neceſſary for the finding the Longitude, there is no Difficulty, nor great Labour to be uſed by them who are well learned. But for vulgar Uſe to Seamen, the ordinary Tables of Declinations and Right Aſcenſions of Stars, as correctly given by late Authors, may ſuffice; for even Learned Men differ in their Practice of finding them, in ſome few Minutes, which Seamen regard not.

IV. But leſt Seamen think it too much to learn the knowledge of Five or Six Stars, ſo as by Sight to diſtinguiſh them from all others; to eaſe them of that Trouble, and to encourage them in ſo good a Work, I ſhall name at preſent but one only Star, which they muſt learn to know by Sight, and note down in Writing; *viz.* the Star call'd *Scheder*, in the Breaſt of *Caſſiopeia*; the Declination of it, which in correct Tables is 54 Deg. 55 Min. and its Right Aſcenſion 6 Deg. 4 Min. or thereabouts. But ſuch as have more Capacity than others, may learn to know as many Stars as they can, ſo as by Sight to diſtinguiſh them; and to note down in Writing, their Declinations and Right Aſcenſions, for their Uſe in working any Queſtion at Sea, about finding the Longitude by not one Star only, but by as many as they pleaſe; and yet all, (if the Operation be rightly performed, according to the Rules here to be deliver'd) to agree to Admiration, as much as when any one Queſtion in Trigono-

metry may be wrought many ſeveral ways, and by ſeveral *Datums*, and yet all to agree, with ſo little Difference as is not to be notic'd. For what Difference happens in working Queſtions in Trigonometry is not in the Rules, which are moſt certainly true, but in taking an Angle or a Side too much or too little, as a Minute more or leſs will occaſion ſome Diverſity in reſolving the Queſtion; as is well known to the Learned. And that one Star above-mention'd will ſuffice to any Seamen to find their Longitude as far *Eaſt* or *Weſt*, *Southerly* or *Northerly*, as that Star is any where viſible. Not that the ſaid Star has any peculiar Property in it, to diſcover the Longitude, more than any others; for the Longitude may be found by any Star as well as by that: But it, and many other Stars that lye near the Equinoctial Colure in our Hemiſphere, *Eaſt* or *Weſt*, are more commodious for Beginners. And that the working to find the Longitude by ſeveral Stars, whether remote or near, doth agree in the giving the ſame Longitude of your Place, is a ſufficient Demonſtration by proper Effects to proper Cauſes, to prove the Theory and Method I am hereafter to deliver to be true: For no fallacious Cauſe can conſtantly and uniformly produce the ſame Effects.

The PRAXIS *or Operation; How a Man, whether at Sea or Land, may find the Longitude in any Part of the World where he is.*

IT being allowed by all Learned Men in Aſtronomy and Geography, that a Man may begin his firſt Meridian any where, from whence to compute his Longitude from that beginning, as a ſort of *Epocha*; I chuſe to begin it at the Equinoctial Colure, for Reaſons above given: And having found the Longitude of any Place, whether at Sea or Land, from this beginning, it is eaſy by Addition or Subſtraction to reduce it to any vulgar Meridian, or the vulgar Meridian to it; the Vulgar being Ten Degrees *Eaſt* from the ſaid Equinoctial Colure.

After you have well known this Star called *Scheder*, ſo as to diſtinguiſh it by Sight from all other Stars, wait upon the ſaid Star until it come upon its *South* Meridian, as Seamen do to find the Sun's higheſt Altitude; and take its Diſtance from the *Zenith* of your Place, by looking to it, and uſing an *Aſtrolabe*; which is a proper Inſtrument frequently uſed by Seamen in other Countries, to obſerve the Height of a Star, or its *Zenith* Diſtance when it is at its greateſt Height. Suppoſe the *Zenith* Diſtance be found by your *Aſtrolabe* to be 30 Degrees; Note that down for your Uſe, in order to the finding the Longitude.

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This is one Way, that has no more Difficulty in it, nor leſs Exactneſs, than for Seamen to find their Latitude.

Objection. *But it is impoſſible that you can know when that Star comes to the Meridian of your Place, unleſs you know the preciſe and exact Time when it ſhould come upon your Meridian.*

Anſwer. This Objection ſeeks to overthrow all finding the Latitude equally as the Longitude. For this ſee *Page* 4. *Numb.* X.

Objection 2. *When* A B *in the greateſt Circle* (See the Scheme) *are Vertical to* A B *in the leſſer Circle,* B *in the greater Circle is not in its leaſt Diſtance from the Vertex, unleſs the Parallel Arches* A B *in the leſſer Circle, and* A B *in the greater Circle, be in the Meridian.*

Anſwer. The Words of the Objection are wrongly expreſſed, and carry in them a Contradiction to the Fundamentals of Aſtronomy: For it ſuppoſeth that Two *Zenith* Fixed Stars or Points in the Starry Firmament, ſuch as *A B* in the greater Circle, can be nearer one another at one Place than another; which is contrary to Principle II. in *Page* 2. of this Treatiſe: The which ſaid Principle is univerſally received among all the Profeſſors of Aſtronomy, *viz.* That all Fixed Stars and Points in the Starry Firmament

ment, keep the ſame Diſtance where they are, and whatſoever *Azimuth* they appear on, as well as Meridian: For otherwiſe they would not be Fixed Stars, but Planets: They change indeed their Horizontal Diſtance, ſo as to be nearer the Horizon of the Place where you are, at one time, than another: And ſuch Stars as never deſcend to the Horizon ſo as to touch it, namely the Star above mention'd, call'd *Scheder*, having Latitude 54 Degr. 55 Min. never comes nearer to the Horizon than at the Diſtance of 19 Degr. 50 Min. which is its neareſt Diſtance to the Horizon: And when it is at the neareſt Diſtance of 19 Degr. 50 Min. it is then upon the *North* Meridian; and when it is 70 Degr. 10 Min. from its neareſt Diſtance to the Horizon upwards, then it is at its greateſt Height upon the *South* Meridian. But ſtill it keeps the ſame Vertical Diſtance from the other Star or Point *A*; both being Vertical Stars or Points to their reſpective Places on Earth, ſuch as *B A* in the leſſer Circle. The Words of the Objection being thus corrected, to render them conſiſtent with the Fundamental Principles of Aſtronomy, by ſaying, when the Star *B* comes to its neareſt Diſtance to your Horizon, the ſaid Star is upon the Meridian, and then by your Obſervation you can take its true Diſtance from your *Zenith*; and both the Stars or Points are *Zenith* Points. But this is ſo far from impugning my New Theory and Method of finding the Longitude, that it confirms it, and perfectly agrees with the Practice. But

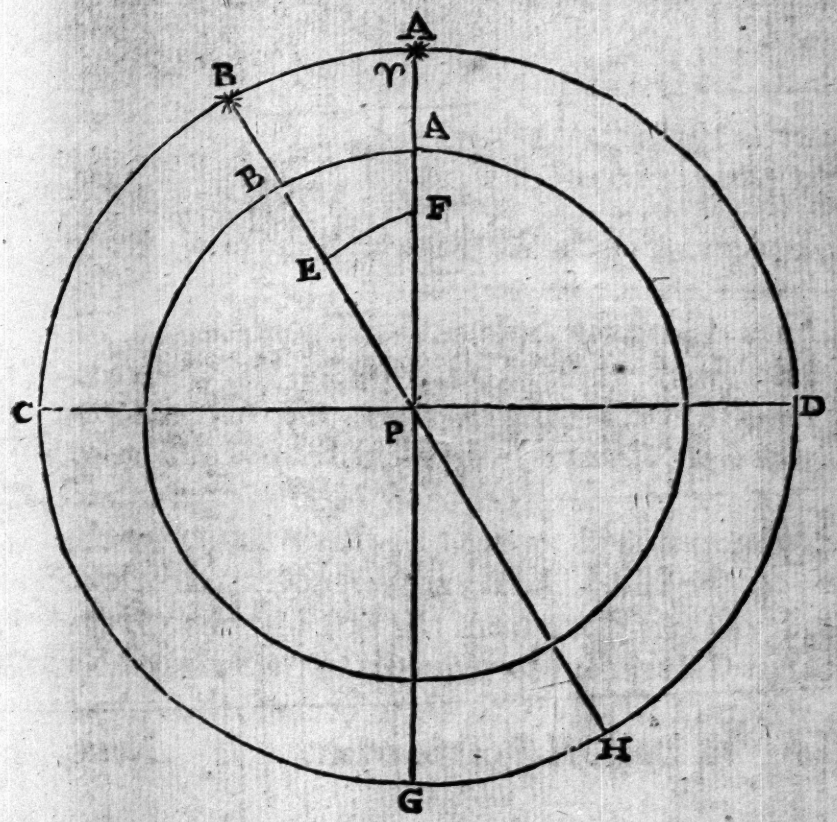
I know a Way to take the true Distance of the Point *A* (when there is not a Star at *A*) from the Star *B*, at any Time of the Night, as well when it is not on the Meridian, as when it is on it: But for Brevity sake, I shall not here mention it: For without that other Way, the Longitude can be found as well as the Latitude, by waiting upon the Star until it comes to the Meridian of your Place, as is above shewed.

Now for a Conclusion of the whole Matter with Relation to the Practice.

First, By Observation how soon the Star *Scheder* comes to the *South* Meridian of your Place, take his Distance from your *Zenith* by your Instrument above-mentioned.

Secondly, By this Distance form to your self in Mind a Spherical Oblique Triangle, such as that in the Scheme, *viz.* *P E F*, whose Side *P E* is the Complement of the Latitude of one of your Places, and *P F* the Complement of the Latitude of your other Place, and *E F* the Distance found; which Three Sides being given, by a Canon in Spherical Trigonometry, you can find the Angle at the Pole, which is the true Longitude required of *B* from the Star called *Scheder*, at the Equinoctial Colure, by which you observed. And because he is 6 Degrees *East* of the Equinoctial Colure, you must add to the Longitude found by the Star *Scheder* the said 6 Degr. and that gives your whole Longitude of your Place from the first Meridian at the Equinoctial Colure. But to reduce it to the Vulgar Meridian, you must subtract 10 Degr. because the Vulgar Meridian is 10 Degr. *East* of the other. Next,

Next, to find the Longitude of any Two Places having the ſame Latitude, lying due *Eaſt* or *Weſt*, the one from the other; Firſt obſerve the Diſtance betwixt your *Zenith* where you are, and the *Zenith* of the Star *Scheder*, as before, and take that Diſtance for one Side of your Triangle, and take the Complement of your Latitude for another, and the Declination of the Star *Scheder*, anſwering to the Latitude of the Place whoſe *Zenith* Star it is for the Third Side, and that will give you the Angle at the Pole; and adding to it 6 Degrees, as above, that will give the Longitude of your Two Places, from the firſt Meridian at the Equinoctial Colure.



Next, to find the Longitude of any Two Places ha-
ing the same Latitude, lying due East or West, the one
om the other; First observe the Distance betwixt your
Zenith where you are, and the Zenith of the Star Sched.
s before, and take that Distance for one Side of your Tri-
ngle, and take the Complement of your Latitude for
nother, and the Declination of the Star Sched. another
ng to the Latitude of the Place whole Zenith Star it
s for the third Side, and that will give you the Angle at
he Pole; and adding to it 6 Degrees, as above, that will
ive the Longitude of your Two Places, from the first
Meridian at the Equinoctial Colure.